

WHAT IS CLAIMED IS:

1. A method of forming a semiconductor device, comprising the steps of:
forming a gate electrode on a substrate;
forming a polysilicon reoxidation layer over the substrate and the gate electrode;
depositing a nitride layer over the polysilicon reoxidation layer; and
anisotropically etching the nitride layer and stopping on the polysilicon reoxidation layer to form nitride offset spacers on the gate electrode.
2. The method of claim 1, further comprising forming source/drain extensions in the substrate after the nitride layer has been etched, subsequently forming sidewall spacers on the offset spacers, and forming source/drains in the substrate.
3. The method of claim 2, further comprising forming halo implants in the substrate prior to depositing the nitride layer.
4. The method of claim 1, wherein the anisotropic etching is performed with a reactive ion etch process with a high nitride to oxide selectivity.
5. The method of claim 4, wherein the step of forming a polysilicon reoxidation layer comprises thermally growing oxide on the substrate and the gate electrode at temperatures between about 700°C to about 900°C.
6. The method of claim 5, wherein the polysilicon reoxidation layer is between about 15Å to about 50Å thick.
7. The method of claim 6, wherein the step of anisotropically etching the nitride layer includes reactive ion etching with CHF_3 plasma etch gas.
8. The method of claim 7, further comprising removing the exposed polysilicon reoxidation layer after the nitride layer has been etched and prior to forming source/drain extensions in the substrate.
9. The method of claim 8, wherein the removing of the exposed polysilicon reoxidation layer includes wet etching the exposed polysilicon reoxidation layer.

10. The method of claim 9, wherein the exposed polysilicon reoxidation layer is wet etched with 100:1 HF solution.
11. A method of forming a semiconductor device with halo implants, comprising the steps of:
- forming a gate electrode on a substrate;
 - forming an etch stop layer on the substrate;
 - forming a nitride layer on the etch stop layer;
 - etching the nitride layer to form offset spacers on the gate electrode, and
- stopping the etching on the etch stop layer; and
- forming halo implants in the substrate.
12. The method of claim 11, wherein the etch stop layer is a polysilicon reoxidation layer.
13. The method of claim 12, further comprising forming source/drain extensions and source/drain implants by implantation through the polysilicon reoxidation layer after the nitride layer has been etched.
14. The method of claim 12, further comprising removing portions of the polysilicon reoxidation layer exposed by the etching of the nitride layer to thereby expose the substrate.
15. The method of claim 14, wherein the step of removing portions of the polysilicon reoxidation layer includes wet etching.
16. The method of claim 15, wherein the step of etching the nitride layer includes reactive ion etching the nitride layer with a plasma etchant gas that has a high nitride to oxide selectivity.
17. The method of claim 12, wherein the step of etching the nitride layer includes reactive ion etching the nitride layer with a plasma etchant gas that has a high nitride to oxide selectivity.